2408*i* Indicator and Alarm Unit

1 User Guide

Thank you for choosing the 2408*i* panel mounted indicator. It will provide accurate measurement and display of temperature and other process variables. A modular build accepts a wide range of plug-in modules allowing: up to four alarm outputs, two process variable (PV) inputs, direct strain gauge/pressure sensor measurements, custom linearisation, analogue retransmission, remote setpoint (SP) input and digital communications.

The indicator is supplied configured in accordance with the order code. The order code and instrument serial number is shown on a label fixed to the top of the case, and this can be checked against the order code given in section 3 of these instructions.

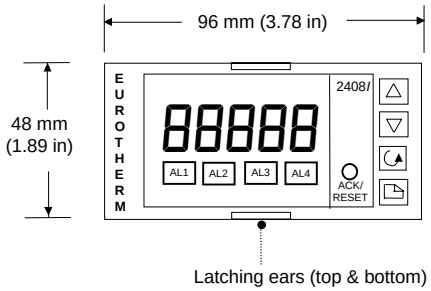
EUROTHERM
CONTROLS
PROCESS AUTOMATION
RECORDERS

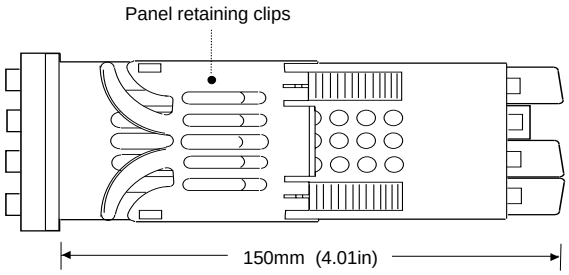
1.1 CONTENTS OF PACKAGE

1. A peel-off label set - a convenient position is to fix a label to the top right of the display.
2. A 2.49Ω resistor used as the load resistor for mA inputs
3. Two panel retaining clips

°C	°F	K	kPa	V	mV
m/s	cm/s	l/h	mWG	A	mA
x10	1x10	l/min	T/h	%	%RH
p.s.i	bar	mbar	mPas	%pH	pH
p.s.i.x10	mmHg	Kg/cm^2	gal/min	rev/min	mile/h
					Amps

1.2 DIMENSIONS AND INSTALLATION

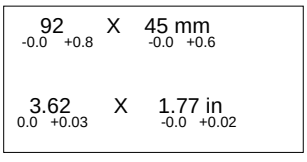


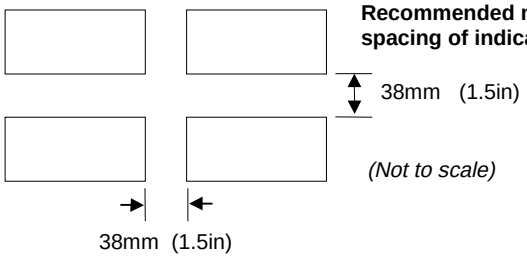


1.2.1 To Install the Indicator

Please read the safety information in section 4 before proceeding.
The indicator is intended to be mounted on a panel within an enclosure such as a control cubicle.

1. Prepare the panel cut-out to the size shown.
2. Insert the indicator through the cut-out.
3. Spring the panel retaining clips into place. Secure the indicator in position by holding it level and pushing both retaining clips forward.
4. Peel off the plastic film protecting the front of the indicator.





1.2.2 Removing The Indicator From The Sleeve

The indicator can be removed from its sleeve by easing the latching ears outwards and pulling it forward out of the sleeve. When plugging the indicator back into its sleeve, ensure that the latching ears click into place to maintain the moisture sealing protection.

CE This indicator meets the European directives on safety and EMC

Invensys
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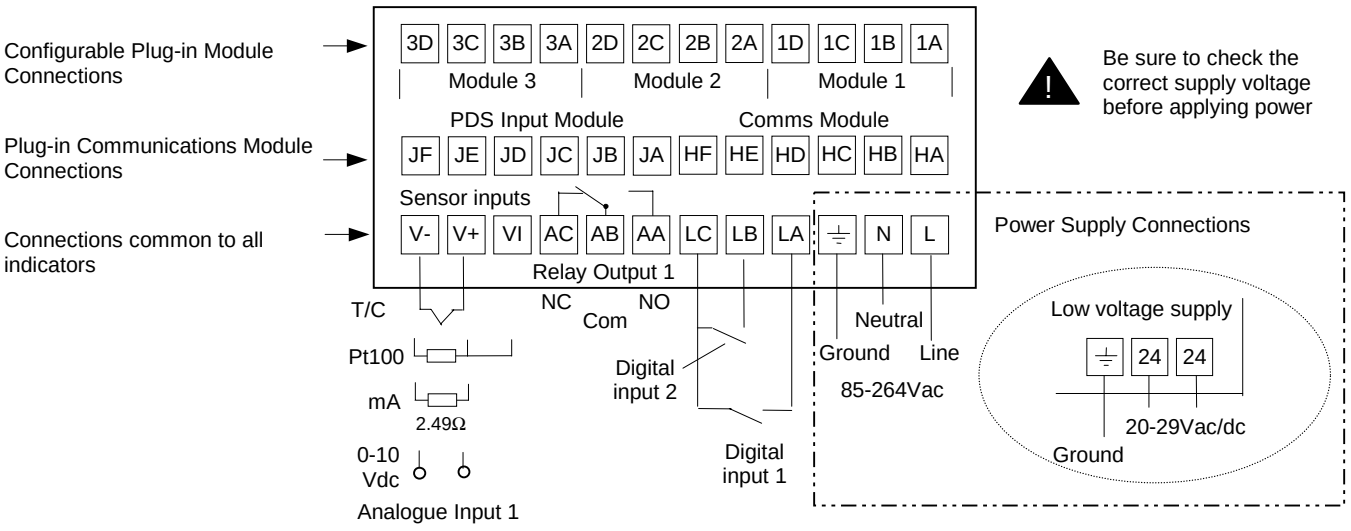
ENG

1.3 ELECTRICAL CONNECTIONS



1.3.1 Wiring

The screw terminals accept wire sizes from 0.5 to 1.5 mm (16 to 22 AWG) and should be tightened to a torque of 0.4Nm (3.5lb in). Hinged terminal covers provide IP20 protection.

1.3.2 Plug-in Module Connections

Modules are fitted in positions 1, 2 and 3 in accordance with the ordering code. The tables below show the connections for each module and the possible functions they can perform.

Note: On the wiring label the module number precedes the terminal identity letter given in the table below. For example, 1A, 1B, 1C.

Module Type	Terminal Identity A	B	C	D	Typical Functions
Relay; changeover					Alarm or Event
Dual relay (normally open)					Alarms or events
DC retransmission	+	-			Retrans. of PV
Transmitter supply 24V	+	-			To power transmitters
Strain Gauge Transducer supply (see note 1)	+	-	Cal resistor		To power strain gauges. (5V or 10V selectable)

Module Type	Terminal Identity A	B	C	D	Typical Functions
2nd Analogue Input (Analogue Input 2) (module 3 only)			+	-	Thermocouple
					PRT
			+	-	mA (2.49Ω sense resistor)
			+	-	High impedance 0 - 2.0Vdc
			+	-	millivolts
	+			-	0 - 10Vdc
Triple contact input	ip1	ip2	ip3	Com	
Triple digital input	ip1	ip2	ip3	Com	
Triple digital output	op1	op2	op3		

Notes:-

1. By default:
   The transducer supply for input 1 is installed in module position 2
   The transducer supply for input 2 is installed in module position 1
2. All module connections are isolated from the process value, earth, incoming supply and connections to other modules.
3. Digital inputs are non-isolated from the process value.
   Digital inputs are powered by the indicator. Switching voltage and current 24Vdc/20mA.

See Section 5 for specifications and maximum safety limits

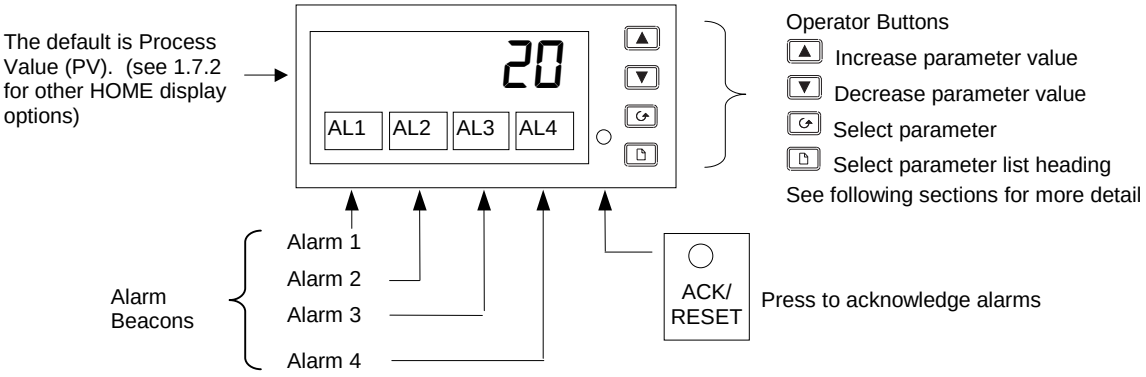
1.3.3 Communications Modules

Digital Communications Module					
	Terminal identity				
Module type	HB	HC	HD	HE	HF
RS232	-	-	Com	Rx	Tx
RS485 (2-wire)	-	-	Com	A (+)	B (-)
RS485 (4-wire)	Rx+	Rx-	Com	Tx+	Tx-
Profibus	Shield	VP	B	A	DGND

PDS Module			
	Terminal identity		
	JD	JE	JF
Setpoint Input	-	Signal	Common

2 Operation

Switch on the indicator. After a 3 second self-test sequence, you will see the display shown below. This is called the '**HOME'** display.



2.1.1 To View The Display Units

If the indicator has been configured for a thermocouple or RTD input, the temperature units can be viewed as follows:

Do This	This Is The Display You Should See	Additional Notes
1. Press and quickly release the [D] or [▶] button.	0.5 sec °C 20 [D] or [▶]	**Display Units** °C Celsius OR °F Fahrenheit OR °K Kelvin The display units are shown for 0.5 second Note: For linear inputs no units are displayed and, in this case: Pressing [▶] goes directly to the diSP display - see 1.7.2.. Pressing [D] goes directly to the AL List - see 1.7.3.

2.1.2 Home Display Options

When shipped from the factory the HOME display will show the measured temperature or process value. This is the '**front**' display. If either [▼] or [▲] is pressed the display changes to the '**back**' display for a period of two seconds. The back display can show an alternative measurement, such as alarm setpoint or second PV input value.

Do This	This Is The Display You Should See	Additional Notes
Example 1. From the HOME display, press [▼] or [▲] 2. Press [▼] or [▲] again to adjust the Alarm Setpoint between hi & lo limits	'back' display = Alarm setpoint. 2 secs 100 20 [▼] or [▲] 'front' display = Process Value	Parameters which can be allocated to the Front and Back displays <none> The HOME display will be blank and only alarm messages will be flashed <SP> Setpoint (for deviation alarms) <rm.SP> Remote setpoint (for deviation alarms) <PU.Hi> Displays the maximum value on input 1 <PU.Lo> Displays the minimum value on input 1 <PU> Process Value <AL.SP> Alarm 1 setpoint <L 1> Linearised input 1 <L2> Linearised input 2 Note: If the indicator has been ordered to read the highest (order code HI) or lowest values (order code LO) between input 1 and 2, the display shows only this value. If PV function ordered as FN, the displayed reading will be derived from inputs 1 and 2. The back display is not selectable in this mode

Pressing [D] and [▶] together will always return you to the HOME display.
OR
The display will always return to the HOME display if no button is pressed within 45 seconds.
This time is reduced to 10 seconds if an alarm is being displayed.

2.2 ALARMS

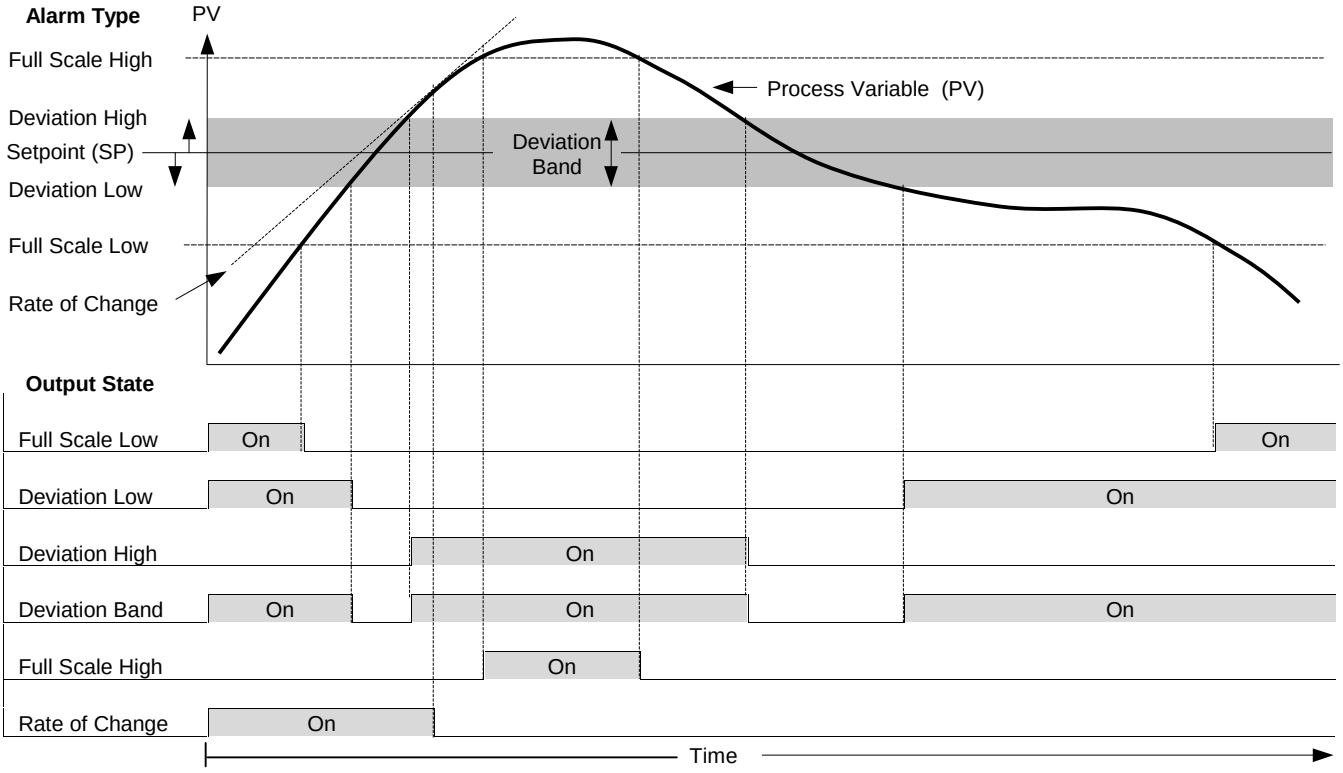
Alarms are used to alert an operator when a pre-set level has been exceeded. They are normally used to switch an output (see 1.10) – usually a relay – to provide external actions to the process.

Soft Alarms are indication only and do not operate an output.

Events are generally defined as conditions, which occur as part of the operation of the plant. They do not require operator intervention and, therefore, do not cause an alarm message to be displayed. They can be attached to operate an output (relay) in the same way as an alarm.

2.2.1 Types of Alarm Used In The 2408i

This section shows graphically the operation of different types of alarm used in the indicator. The graphs show changes in PV plotted against time. The PV may be derived from input 1, input 2 or the main PV, which is derived from input 1 & 2.



Rate of change alarms detect if the rate of change in PV, set as units per minute or per second, exceeds the setpoint value. An alarm setpoint set + will detect positive rates of change. An alarm setpoint set - will detect negative rates of change. Therefore, if it is required to measure the rate of change in both directions then two alarms must be configured. Since rate of change alarms are calculated over a period of time a small delay may be apparent before the alarm is indicated. This is generally only noticeable if the PV changes very quickly.

Hysteresis is the difference between the point at which the alarm switches ON and the point at which it switches OFF.
It is used to prevent relay chatter.

Latching Alarms see 1.12.2.xx.

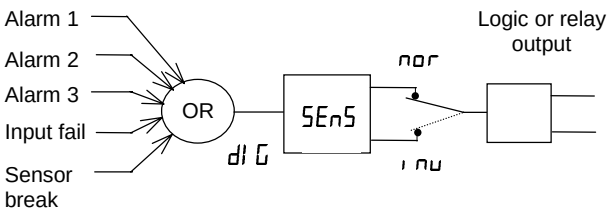
Deviation Alarms. The setpoint used for deviation alarms is normally derived as a remote input from another device - for example, a temperature controller. The setpoint can also be internally set within the controller - in this case called the local setpoint value.

Delay a settable time between an alarm occurring and it being displayed on the indicator

Blocking Alarms only occur <u>after</u> the start up phase when the alarm has first entered a safe state. The alarm is only indicated the next time it is active. It is used, for example, to ignore start up conditions which are not representative of running conditions.

2.2.2 Alarm Relay Output

Alarms can operate a specific logic or relay output. Any individual alarm can operate an individual relay or any combination of alarms can operate an individual relay. They are either supplied pre-configured in accordance with the ordering code or set up in configuration level.



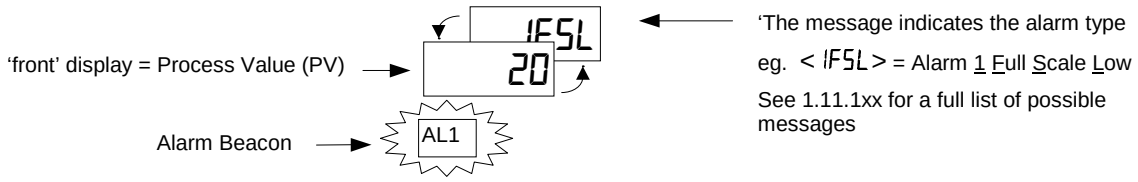
Any combination of alarms can operate the logic or relay output. Typical alarms are shown

2.2.3 Alarm Indication

An alarm occurs when the process conditions exceed a pre-set level (setpoint). It will be displayed on the indicator as follows:-

1. The relevant alarm beacon will begin to flash
2. A four character alarm message will be shown as a double flash in the main display. This message specifies the alarm number (first character) and the type of alarm that has occurred (next three characters). The message is flashed in addition to the 'front' displayed value

If more than one alarm is present the relevant beacon illuminates and further messages are flashed in the main display. The alarm indication will continue while the alarm condition is present and is not acknowledged.


1FSL
20
'front' display = Process Value (PV)
Alarm Beacon
AL1
'The message indicates the alarm type
eg. < 1FSL > = Alarm 1 Full Scale Low
See 1.11.1xx for a full list of possible messages

2.2.4 Alarm Messages

Display	Alarm type	Input Source	Alarm description and function	
First character				
1---			Alarm **1** is active	
2---			Alarm **2** is active	
3---			Alarm **3** is active	
4---			Alarm **4** is active	
Last three characters				
-FSL	**F**ull **S**cale **L**ow	Main PV	The process value is:-	below the low alarm setting
-FL1		PV 1		below the low alarm setting on PV 1
-FL2		PV 2		below the low alarm setting on PV 2
-FSH	**F**ull **S**cale **H**igh	Main PV		above the high alarm setting
-FH1		PV 1		above the high alarm setting on PV 1
-FH2		PV 2		above the high alarm setting on PV 2
-dLo	**D**eviation **Lo**w	Main PV		below the high and low deviation setting on main PV
-dL1		PV 1		below the high and low deviation setting on PV1
-dL2		PV 2		below the high and low deviation setting on PV2
-dHi	**D**eviation **Hi**gh	Main PV		above the high and low deviation setting on main PV
-dH1		PV 1		above the high and low deviation setting on PV1
-dH2		PV 2		above the high and low deviation setting on PV2
-dEu	**Dev**iation Band	Main PV		above or below the high and low deviation setting on main PV
-du1		PV 1		above or below the high and low deviation setting on PV1
-du2		PV 2		above or below the high and low deviation setting on PV2
-rAt	**Rat**e of change (minutes)	Main PV		changing faster than the rate-of change alarm setting in minutes for main input.
-rAS	**Rat**e of change (seconds)	Main PV		changing faster than the rate-of change alarm setting in seconds for main input.
-rt1	**Rat**e of change (minutes)	Input 1		changing faster than the rate-of change alarm setting in minutes for input 1.
-rS1	**Rat**e of change (seconds)	Input 1		changing faster than the rate-of change alarm setting in seconds for input 1.
-rt2	**Rat**e of change (minutes)	Input 2		changing faster than the rate-of change alarm setting in minutes for input 2.
-rS2	**Rat**e of change (seconds)	Input 2		is changing faster than the rate-of change alarm setting in seconds for input 2.
-LSP	**S**et**p**oint **L**ow	Main PV	The setpoint is:-	below the low alarm setting
-HSP	**S**et**p**oint **H**igh	Main PV		above the high alarm setting
Sbr				**S**ensor **Br**eak alarm (open circuit input 1 or derived PV)

i If the **process value flashes** but no other alarm message is displayed, this indicates that the input which is being used as the PV is out of range.

2.2.5 Diagnostic Alarms

In addition to the process alarms given in the previous column the following diagnostic alarms may also appear.
These warn that a fault exists in either the indicator or the connected devices.

Alarm	What it means	What to do about it
EE.Er	*Electrically Erasable Memory Error:* The value of an operator or configuration parameter has been corrupted.	This fault will automatically select configuration level. Check all configuration parameters before returning to operator level. Once in operator level, check all operator parameters before resuming normal operation. If the fault persists or occurs frequently, return the unit for repair.
LLLL	*Out of range low reading*	Check the value of the input
HHHH	*Out of range high reading*	Check the value of the input
Err 1	*Error 1:* ROM self-test fail	Return the indicator for repair
Err2	*Error 2:* RAM self-test fail	Return the indicator for repair
Err3	*Error 3:* Watchdog fail	Return the indicator for repair
Err4	*Error 4: Keyboard failure.* Stuck button, or a button was pressed during power up.	Switch the power off and then on without touching any of the indicator buttons. If the error continues return the unit for repair.
Err5	*Error 5: Input circuit failure*	Return the unit for repair
Hw.Er	*Hardware error* Indication that a module is of the wrong type, missing faulty, or a new module has been fitted.	Check that the correct modules are fitted. Go to configuration mode and set up the required parameter(s). Refer to the Engineering Handbook, Part Number Haxx for further information.
Pwr.F	*Power failure: The line voltage is too low*	Check that the supply is within rated limits
rmt.F	*Remote input fail*	Connect an input device (eg. transducer, thermocouple, mA source) to input 2

2.2.6 To Acknowledge An Alarm

An alarm can be acknowledged in two ways:-

1. Press the ACK/RESET button. (If this does not work it may have been disabled when the indicator was configured).
2. Press and together.

The action, which now takes place, will depend on the type of latching, which has been configured

Non Latched Alarms

If the indicator has been configured for non-latching alarms the following action occurs:-

Alarm condition present when the alarm is acknowledged, will be indicated by a single flash of the alarm message and the beacon will continuously illuminate. This state will continue for as long as the alarm condition remains. When the alarm condition disappears the indication will also disappear.

If a relay has been attached to the alarm output, it will operate when the alarm condition occurs and remain in the operated condition until the alarm is acknowledged **AND** it is no longer present.

If the alarm condition disappears before it is acknowledged the alarm indication disappears as soon as the condition disappears.

Latched Alarms

The indicator may have been configured for Automatic or Manual reset. The action which occurs when the acknowledge button is pressed is described below:-

Automatic.

The alarm continues to be active until both the alarm condition is removed AND the alarm is acknowledged. The acknowledgement can occur **BEFORE** the alarm condition is removed.

Manual

The alarm continues to be active until both the alarm condition is removed AND the alarm is acknowledged. The acknowledgement can only occur **AFTER** the alarm condition is removed.

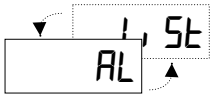
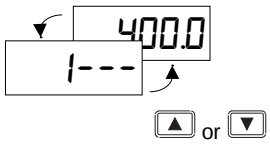
2.2.7 Alarm Inhibit

If a digital input has been configured for alarm inhibit, then all process alarm indication will be prevented for as long as the input is ON. When the input is turned to OFF any alarms which are active will be displayed. If a delay has been set on the alarm, the delay period will start from the time when the input is turned OFF. If the alarm has been configured as latching the latching action is also inhibited whenever the input is ON.

2.2.8 To Change The Alarm Setpoints (trip levels)

Parameters are grouped in 'lists' according to their function. Each list has a heading.

The [D] button steps through the parameter list headings (see section 2.4.1.)
The first list is the alarm setpoints list AL

Do This	This Is The Display You Should See	Additional Notes
1. From any display press [D] as many times as necessary to show the **'Alarm List'** header		If [▲] or [▼] are pressed the word 'L, SE is displayed for 2 secs 
2. Press [G] to show the first parameter in the list 3. Press [▲] or [▼] to change the alarm setpoint	 [▲] or [▼]	There are four alarm setpoints. The first character is the alarm number, the next three the alarm type (see section 2.2.4.) If an alarm has been disabled in configuration level, it will not appear in this list.

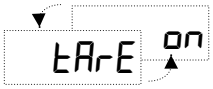
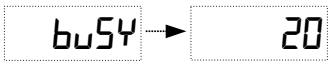
4. To return to the HOME display:-
   - Press [G] and [D] together
   - **or** continue to press [D]
   - **or** the indicator will return to the HOME display if no button is pressed for 45 seconds (10 seconds if an alarm condition is present).

2.3 AUTO-TARE (DISPLAY ZERO)

The auto-tare function is used, for example, when it is required to weigh the contents of a container but not the container itself. Alternatively, it can be used to set a fixed offset on an initial measured value.

2.3.1 To Use Auto Tare

Place the empty container on the weigh-bridge. Then:-

Do This	This Is The Display You Should See	Additional Notes
1. From any display press [D] as many times as necessary to show the **'CAL 1 List'** header		Use CAL2 if the load cell is connected to input 2
2. Press [G] to scroll to tArE 3. Press [▲] or [▼] and change from OFF to on		The indicator automatically calibrates itself to the empty container. When tArE is turned to on, the display will change to buSY. When calibration is complete the display will return to the HOME display. It will then return to the main display. If the calibration fails the alarm message tdr.F (transducer fail) will flash. Press [D] and [G] to acknowledge. 

4. Return to the HOME display as described above

Note:-
The indicator will not return to the HOME display until the calibration procedure completes.

If calibration does not complete after a period of 5 minutes, then calibration is aborted.

The full list of parameters available in these lists is shown in the parameter tables is shown in the following section.

2.4 TO ACCESS AND CHANGE PARAMETER VALUES

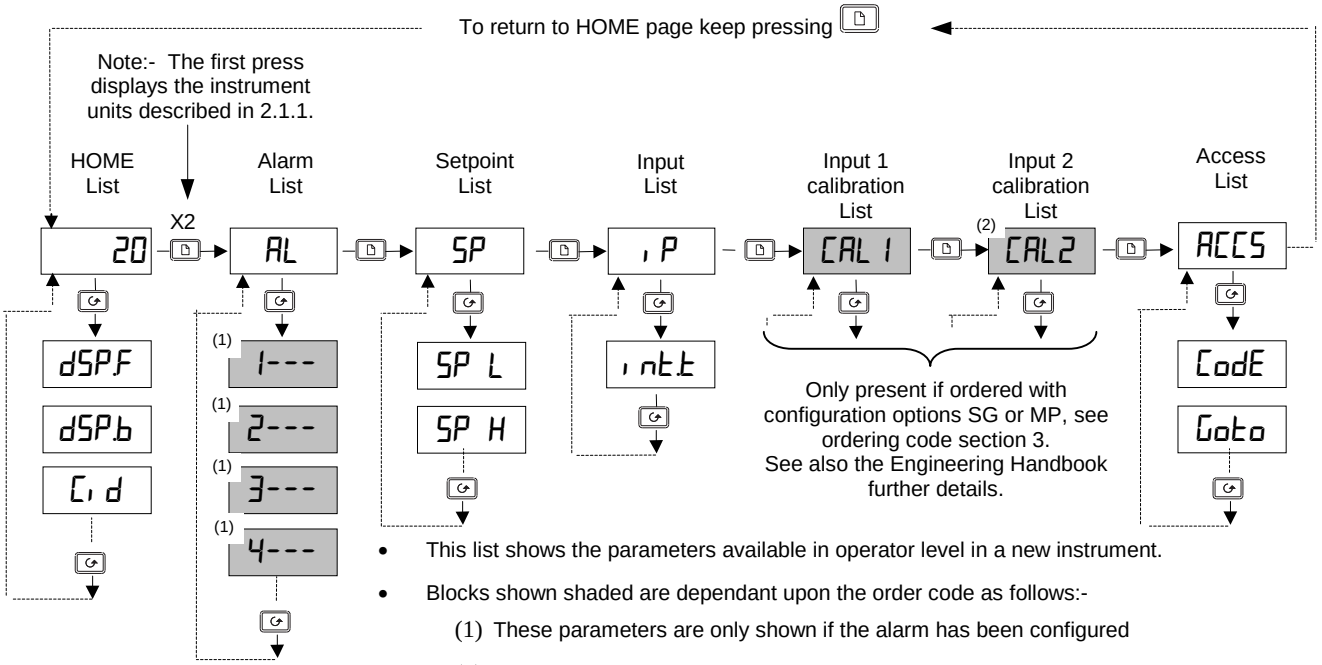
Parameters are settings within the indicator, which determine how it will operate. Examples are Alarm Setpoints and Tare Values already mentioned. They are organised into different lists. Each list has a named heading which describes a particular subject, for example 'Alarms' (AL).

2.4.1 Operator Level Navigation Diagram (factory default)

To find a parameter:-

Press [▯] to select the list heading
Press [↻] to select the parameter
Press [▲] or [▼] to change its value

} Examples are shown in sections 2.2 7. and 2.3.1.



- This list shows the parameters available in operator level in a new instrument.
- Blocks shown shaded are dependant upon the order code as follows:-
  - (1) These parameters are only shown if the alarm has been configured
  - (2) CAL2 list is only shown if Input 2 has been configured
- The above list can be customised to suit the requirements of a particular process. Complete lists or individual parameters in a list can be added during commissioning. The procedure is described in section 3.4 'To Hide. Reveal and Promote Parameters'.

2.5 PARAMETER TABLES

The parameter tables provide a full list of parameters, an explanation of their use and where to find them.

Use these lists to adjust:-

- The alarm setpoints
- The alarm setpoint limits
- The User calibration
- The input filter time constant
- The communications address

20 2.5.1 HOME List

[↻]
[▼]

HOME	Home List	Selectable options		Default
dSP.F	HOME display front	<nonE>	The HOME display will be blank and only alarm messages will be flashed	PU
		<SP>	Setpoint (for deviation alarms)	
		<rm.SP>	Remote setpoint (for deviation alarms)	
		<PU.Hi>	Displays the maximum value on input 1. This parameter is the same as <LOG.H> in <i nFo> list	
		<PU.Lo>	Displays the minimum value on input 1. This parameter is the same as <LOG.L> in <i nFo> list	
		<PU>	Process Value	
		<AL.SP>	Alarm 1 setpoint	
		<L 1>	Linearised input 1	
dSP.b	HOME display back	<L2>	Linearised input 2	
Ci d	Customer defined identity number associated with a physical position	0 to 9999		0

2.5.2 Alarm List

AL

AL	**Alarm list**	Comments	Adjustable Range	Default
1---	Alarm 1 setpoint	The last three letters indicate the Alarm type. See section 2.2.4. If the alarm is disabled the parameter will not appear in this list	Between low and high setpoint limits which As set in the SP list. Rate of change alarms are direction sensitive from-9999 to +99999 units/sec or min	0
2---	Alarm 2 setpoint			0
3---	Alarm 3 setpoint			0
4---	Alarm 4 setpoint			0

2.5.3 Setpoint List

SP

SP	**Setpoint list**	Adjustable Range	Default
SP L	Setpoint low limit – PV alarms	Input range min and max (combination of inputs 1 & 2	As per order code
SP H	Setpoint high limit – PV alarms		

2.5.4 Input List

InP

InP	**Setpoint list**	Adjustable Range	Default
inLt	Input filter integrating time constant Set to a value which reduces the effect of any input noise to an acceptable level. The higher the value the more sluggish the response	OFF to 999.9 seconds	1.6

2.5.5 User Calibration Lists – Inputs 1 and 2

CAL.1 or CAL.2 (CAL 2 only appears if input 2 has been configured)

CAL.-	**User calibration 1 or 2 list**	Adjustable Range	Default
tArE	Performs automatic 'Tare' correction See also section 2.3.	OFF = Off on = start correction buSY = inputting value donE = finished inputting value	OFF

2.5.6 Access List

ACCS

The Access List provides password protected access to further levels of operation as listed below. See section 3 of the Engineering Handbook, part No. HA027240, for further details.

codE	A code number can be entered using the ▼ or ▲ buttons. If an incorrect code number is entered the display will revert to <codE>. If no button is pressed within 45 seconds the indicator will automatically return to the HOME display.

For information on further levels of access, see the following sections.

i Details of configuration are not included in this operation guide. A full engineering reference and configuration manual is available from the Eurotherm web site or as a booklet, part number HAxx.

3 Ordering Code

Model number	Function	Display colour	Supply voltage	Module 1	Module 2	Module 3	Relay Output 1	Comms Module	PDS Module	Manual
2408*i*	AL									

Function	
AL	Indicator/Alarm unit
AP	Profibus Indicator

Display colour	
GN	Green display
RD	Red display

Supply voltage	
VH	85-264Vac
VL	20-29Vac/dc

Note 1: By default, alarm 1 will be assigned to relay output 1 and alarms 2, 3 and 4 will be assigned to Modules 1, 2 and 3 respectively.

Note 2: The allocation of alarms to the dual relay outputs must be performed in configuration by the customer.

Note 3: Triple contact or logic inputs can be configured, by the user, for any of the functions listed under Digital Inputs 1 and 2.

Note 4: The triple logic output can configured as alarm outputs or as telemetry outputs via digital communications.

Modules 1, 2 and 3	
XX	Module not fitted
Alarm Relay output (change-over)	
R4	Module fitted unconfigured
OR Select alarm configuration from table A.	
DC retransmission	
D6	Module fitted unconfigured
First character	
V-	Process Value retransmission
S-	Setpoint retransmisssion
Z-	Error retransmission
Second character	
-1	0-20mA
-2	4-20mA
-3	0-5Vdc
-4	1-5Vdc
-5	0-10Vdc
Dual relay (Note 2)	
RR	Module fitted unconfigured
Triple contact input (Note 3)	
TK	Module fitted unconfigured
Triple logic input (Note 3)	
TL	Module fitted unconfigured
Triple logic output (Note 4**)**	
TP	Module fitted unconfigured
20mA Transmitter supply	
MS	24Vdc, 20mA supply
Strain Gauge Transducer supply (modules 1 & 2 only) (note 5)	
G3	5V transducer supply
G5	10v transducer supply
2nd analogue input (module 3 only)	
D5	Module fitted unconfigured
	For configuration, see PV Function field

Relay Output 1	
XX	Not fitted
RF	Fitted unconfigured
OR Select alarm configuration from table A	

Table A:
Alarm relay configuration
(See note 1)

Non-latched alarms	
FH	High alarm
FL	Low alarm
DB	Deviation band alarm
DL	Deviation low alarm
DH	Deviation high alarm
RA	Rate-of -change alarm
Latched alarms	
HA	High alarm
LA	Low alarm
BD	Deviation band alarm
WD	Deviation low alarm
AD	Deviation high alarm
RT	Rate-of -change alarm
NW	New alarm

Note 5: By default, the transducer supply for input 1 will be installed in module position 2 and the transducer supply for input 2 in module position 1.

Comms module	
XX	Module not fitted
RS232 Module	
A2	Module fitted unconfigured
AM	Modbus protocol
AE	EI-Bisynch protocol
RS485 (2-wire) Module	
Y2	Module fitted unconfigured
YM	Modbus protocol
YE	EI-Bisynch protocol
RS485 (4-wire) (= RS422) Module	
F2	Module fitted unconfigured
FM	Modbus protocol
FE	EI-Bisynch protocol
Profibus Module	
PB	High speed RS485

PDS module	
XX	Module not fitted
M6	Module fitted unconfigured
RS	Remote setpoint input

Manual	
XXX	None
ENG	English
FRA	French
GER	German
NED	Dutch
SPA	Spanish
SWE	Swedish
ITA	Italian

SOFTWARE CONFIGURATION						Configuration of 2nd analogue input requires D5 in module 3				
Sensor Input	Setpoint min	Setpoint max	Display Units	Digital input 1	Digital input 2	2nd DC Input	PV Function	2nd Input Display Min	2nd Input Display Max	Configurat-ion option
	Note 6	Note 6				Note 7		Note 8	Note 8	

Sensor input & 2nd DC input			Setpoint min & max			
			°C		°F	
Thermocouples			Min	Max	Min	Max
J	Type J		-210	1200	-340	2192
K	Type K		-200	1372	-325	2500
T	Type T		-200	400	-325	750
L	Type L		-200	900	-325	1650
N	Type N		-250	1300	-418	2370
R	Type R		-50	1768	-58	3200
S	Type S		-50	1768	-58	3200
B	Type B		0	1820	32	3308
P	Platinell II		0	1369	32	2496
Z	Pt100		-200	850	-325	1562
Process inputs (Scaled to setpoints max & min)			Range Min		Range Max	
F	-100 to +100mV		-9999		99999	
Y	0 to 20mA (note 2)		-9999		99999	
A	4 to 20mA (note 2)		-9999		99999	
W	0 to 5Vdc		-9999		99999	
G	1 to 5Vdc		-9999		99999	
V	0 to 10Vdc		-9999		99999	
Factory downloaded input						
C	Type C -W5%Re/W26%Re (default downloaded input)	"Table Reference Number" CtC	0 to 2319		32 to 4200	
D	Type D - W3%Re/W25%Re	"T035"	0 to 2399		32 to 4350	
E	E thermocouple	"T012"	-270 to 999		-450 to 1830	
1	Ni/Ni18%Mo	"T033"	0 to 1399		32 to 2550	
2	Pt20%Rh/Pt40%Rh	"T025"	0 to 1870		32 to 3398	
3	W/W26%Re (Engelhard)	"T09"	0 to 2000		32 to 3632	
4	W/W26%Re (Hoskins)	"T029"	0 to 2010		32 to 3650	
5	W5%Re/W26%Re (Engelhard)	"T011"	10 to 2300		50 to 4172	
6	W5%Re/W26%Re (Bucose)	"T038"	0 to 2000		32 to 3632	
7	Pt10%Rh/Pt40%/Rh	"T023"	200 to 1800		392 to 3272	
8	Exergen K80 I.R. Pyrometer	"ErBO"	-45 to 650		-49 to 1202	

Display Units			
C	°C	K	°K
F	°F	X	Blank

PV function	
XX	Input 1 displayed
LO	PV = the lowest of i/p 1 and 2
HI	PV = the highest of i/p 1 and 2
FN	PV derived from i/p 1 and 2
RS	Remote setpoint

Digital inputs 1 & 2	
XX	Disabled
AC	Alarm acknowledge
KL	Keylock
SR	Remote setpoint select
PV	Select process value input 2
M5	CTX mode 5 (digital input 2 only). For use with PDTCX 'smart' current transformer.
J1	Initiate tare correction on strain gauge input 1
J2	Initiate tare correction on strain gauge input 2
J3	Initiate automatic calibration of strain gauge input 1
J4	Initiate automatic calibration of strain gauge input 2

Configuration Option	
XX	Standard
SG	Load cell/strain gauge
CL	pressure transducer

Note 6: Setpoint min and max: Include the decimal points required in the displayed value; up to one for temperature, up to two for process inputs.

Note 7: Select the code required from the Sensor Input table

Note 8: These two fields are used to scale the 2nd DC input if it is a linear process input, otherwise it should be left blank.

Note 9: For mA inputs, a 1% 2.49Ω current sense resistor is supplied. If greater accuracy is required, a 0.1% resistor can be ordered as Part number SUB2K/249R.1

4 Safety and EMC Information

Safety

This indicator complies with the European Low Voltage Directive 73/23/EEC, amended by 93/68/EEC, by the application of the safety standard EN 61010.

Electromagnetic compatibility

This indicator conforms to the essential protection requirements of the EMC Directive 89/336/EEC, amended by 93/68/EEC, by the application of a Technical Construction File. This indicator satisfies the general requirements of the industrial environment defined in EN 50081-2 and EN 50082-2.

General

The information contained in these instructions is subject to change without notice. While every effort has been made to ensure the accuracy of the information, your supplier shall not be held liable for errors contained herein.

Unpacking and storage

The packaging should contain the indicator, two panel retaining clips, a 2.49Ω current sense resistor and this instruction leaflet.
If the packaging or the indicator is damaged, do not install the product but contact your supplier.

This indicator has no user serviceable parts. Contact your supplier for repair.

Caution: Charged capacitors

Before removing the indicator from its sleeve, switch off the supply and wait two minutes to allow capacitors to discharge. Failure to observe this precaution may damage the indicator or cause mild electric shock.

Precautions Against Electrostatic Discharge Damage

When the indicator is removed from its sleeve, it is vulnerable to damage by electrostatic. To avoid this, observe anti-static handling precautions.

Cleaning

Do not use water or water based products to clean labels or they will become illegible. Isopropyl alcohol may be used to clean labels. A mild soap solution may be used to clean other exterior surfaces of the product.

Safety Symbols

The following safety symbols are used on the controller and in this manual:

Caution, Important safety information

Functional earth (ground) terminal

Useful information or hint

Personnel

Installation must be carried out by qualified personnel.

Enclosure of live parts

The indicator must be installed in an enclosure to prevent hands or metal tools touching parts that may be electrically live.

Caution: Live sensors

The alarm acknowledge/keylock input is electrically connected to the sensor input (e.g. thermocouple). In some installations the temperature sensor may become live. The indicator is designed to operate under these conditions, but you must ensure that this will not damage other equipment connected to the logic input/output and that service personnel do not touch this connection while it is live. With a live sensor, all cables, connectors and switches for connecting the sensor and non-isolated inputs and outputs must be mains rated.

Wiring

Wire the indicator in accordance with the wiring data given in these instructions. Take particular care not to connect AC supplies to the low voltage sensor input or logic outputs. Only use copper conductors for connections, (except thermocouple). Ensure that the installation complies with local wiring regulations, and observe maximum voltage safety limits.

Power Isolation

The installation must include a power isolating switch or circuit breaker that disconnects all current carrying conductors. The device should be mounted in close proximity to the indicator, within easy reach of the operator and marked as the disconnecting device for the indicator.

Voltage rating

The maximum continuous voltage applied between any connection and ground must not exceed 264Vac.

For the above reason the indicator should not be wired to a three-phase supply with an unearthed star connection. Under fault conditions such a supply could rise above 264Vac with respect to ground and the product would not be safe.

Conductive pollution

Electrically conductive pollution must be excluded from the cabinet in which the indicator is mounted. For example, carbon dust is a form of electrically conductive pollution. Where condensation is likely, for example at low temperatures, include a thermostatically controlled heater in the cabinet.

Installation requirements for EMC

- For general guidance refer to EMC Installation Guide, HA025464.
- It may be necessary to fit a filter across the relay output to suppress conducted emissions. The filter requirements will depend on the type of load. For typical applications we recommend Schaffner FN321 or FN612.

Routing of wires

To minimise the pick-up of electrical noise, the sensor input wiring should be routed away from high-current power cables. Where it is impractical to do this, use shielded cables with the shield grounded at both ends.

5 Technical Specification

Main process value input and second DC input

Low level range	-100 to +100mV
High level range	0-20mA or 0-10Vdc
Sample rate	9Hz
Resolution	<2µV for low level inputs <2mV for high level inputs
Linearity	Better than 0.2°C
Calibration accuracy	±0.2% of reading, or ±1°C or ±1LSD, whichever is the greater
User calibration	Low and high offsets can be applied
Input filtering	OFF to 999.9 seconds
Thermocouple types	Refer to ordering code sensor input table
Cold junction compensation	In automatic mode, >30:1 rejection of ambient temperature change.
3-wire Pt100 input. Bulb current:	0.3mA
Maximum lead resistance	Up to 22Ω in each lead without error
2nd analogue input functions	2nd process value, remote setpoint, select min, select max, derived value
Input impedance, mV inputs	>10MΩ
Input impedance, Volt inputs	>69KΩ

Digital inputs

Contact closure or open collector inputs

Note: These are powered by the controller

Digital inputs 1 & 2 (Non isolated from PV)	Switching voltage/current: 24Vdc/20mA nominal Off state resistance <100Ω On state resistance >28KΩ
Triple contact closure inputs	Isolated. Specification as dig. inputs 1 & 2

Externally powered inputs

Triple logic inputs	Off state: <5Vdc On state: 10.8 to 30Vdc @ 2.5mA

Digital input functions

As per digital inputs 1 & 2 in the ordering code

Digital outputs

Relay rating	2A, 264Vac resistive
Triple logic output	8mA, 12Vdc per channel
Digital output functions	as per the ordering code

DC retransmission

Range	Scaleable between 0-20mA and 0-10Vdc
Resolution	1 part in 10,000
Retransmission values	Process value, setpoint or error from

Transmitter supply

Rating	20mA, 24Vdc

Strain gauge bridge supply

Bridge voltage	Software selectable, 5 or 10Vdc
Bridge resistance	300Ω to 10KΩ
Internal shunt resistor	30.1KΩ at0.25%, used for calibration of 350Ω bridge

Alarms

Number of alarms	Four
Alarm types	High, low, deviation high, deviation low, deviation band, rate of change in units/sec, rate of change in units/min, new alarm status. Sensor break alarm
Alarm modes	Latching or non-latching. Blocking Energised or de-energised in alarm
Alarm delay	OFF to 999.9 secs

Communications

Module types	RS232, 2-wire RS485 and 4-wireRS485
Protocols	Modbus® or EI-Bisynch (ASCII)

PDS

Functions	Remote setpoint input from master controller

General

Display colour	Red or green options
Number of digits	Five with up to three decimal places
Supply	100 to 240Vac -15%+10% OR 24 Vdc or ac -15%+20%
Power consumption	15W max
Operating ambient	0 to 55°C and 5 to 95% RH non-condensing
Storage temperature	-10 to +70°C
Panel sealing	IP65
Dimensions	96W x 48H x 150D
Weight	400g max
EMC Standards:	EN50081-2 & EN50082-2 generic standards for industrial environments
Safety standards	Meets EN 61010, Installation category II, pollution degree 2.
Atmospheres	Not suitable for use above 2000m or in explosive or corrosive atmospheres

6 International Sales & Service

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Faraday Close, Durrington, Worthing, West Sussex BN13 3PL
Telephone Sales: (01903) 695888
Technical: (01903) 695777
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